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April 30, 2003

VIA E-MAIL: thompsod@michigan.gov
Permits and Technical Support Unit
Groundwater Section-Water Division
Michigan Department of Environmental Quality (MDEQ)
Constitution Hall
P. O. Box 30473
Lansing, MI 48909-7973

Re: Hydrogeologic Study Work Plan Supplement
Williamsburg Receiving and Storage
Groundwater Discharge Permit # M 0086
ISE Project #02633061-22E

Dear Mr. Thompson:

We have initiated elements of the Hydrogeologic Study Work Plan (HSWP) submitted for your review on October 15, 2002. The HSWP elements addressing Series 100, 200, 300 and 400 areas are underway. At present, direct-push (Geoprobe) equipment is being utilized to sample soil (continuous sampling) in the vadose zone within these target areas. Since this sampling equipment is also capable of employing hollow stem augers, we are also installing monitoring wells when the depth to the water table permits. Our intent is to mobilize hollow stem auger drilling equipment to the site for the most challenging drilling conditions; those areas where the water table is deep and where till soils may impede direct push equipment.

Series 100 through Series 400 Study Areas

As I understand your comments you are in agreement with the HSWP in regard to the Series 100 through Series 400 target areas. All monitoring wells will be sampled for chloride ion concentrations in accordance with your comments.

Storage Lagoon

With regard to the wastewater storage lagoon, we will install wells in this area following installations in other areas so that potentiometric surfaces may be determined and hydrogeologic cross sections prepared prior to installations. This will allow for optimal location and construction of monitoring wells in this area. We understand that MDEQ will require wells in this area for monitoring groundwater in the event that a new Groundwater Discharge Permit is issued. It is also understood that this comment (page 3 of the January 14th review letter) regarding the Storage Lagoon does not address Section IV(c.) of the Consent Order which require a study to determine the impact of *brine pits and wastewater discharges* on groundwater.

Former Northwestern Brining Pit Area Monitoring Well Work Plan

I believe that the depth to groundwater in this area of the site is quite shallow. So shallow in fact that it is likely more pragmatic to install two (2) wells than to discuss your comments at length. Monitoring well installation is proposed and will be undertaken in accordance with the same methodology considered in the HSWP for other well installations. As with the Storage Lagoon area, these wells will be installed following determination of groundwater flow potential using wells from the Series 100 through Series 400 areas.

I do offer the brief technical dissertation below for your consideration. If, upon review of the following, you are inclined to reconsider your requirement for wells in this area, we would appreciate a redaction of your prior suggestion.

In order for chloride ions released to soil in the vadose zone to become "mobile" within the unsaturated zone, one of the following must occur:

- a portion of the vadose zone must become saturated
- precipitation must infiltrate through the affected area of the vadose zone and leach (unsaturated vertical flow) chloride ions from the unsaturated soil

With respect to the first condition, this implies a release of such proportion that saturated vertical flow occurs in the vadose zone. As such, the inventory of a leaking brine pits would be noticeably diminished. As I understand from WRS staff, there is no documented inventory losses from brine pits anywhere at this site during their operation.

With respect to the second point, leaching can only occur if the area above a release is open to infiltration. In the case of the Northwest Brining Pit Area, this area was covered with bituminous pavement. The earthen pits were lined with PVC liners and the lined pits themselves were covered with polyethylene. With no documented release and no avenue for infiltration, I cannot fathom the physics of the asserted chloride "mobility". The absence of chloride in soil samples from this area suggest that there has been no release since no chloride is detected where it should be present had a release occurred. The soil assessment occurred immediately following removal of the impervious covering materials.

First Quarter-2002 Spray Irrigation Area Monitoring Well Work Plan

Again, I believe the pragmatic approach in this case is to concede to your request for monitoring wells in this area as opposed to a protracted discourse regarding the physics of partitioning of chemicals between soil and groundwater.

It is proposed that two (2) monitoring wells be installed within the Q1-02 Irrigation Area in accordance with methodology described in the HSWP. These well are proposed to be installed following determination of groundwater flow potential using wells from the Series 100 through Series 400 areas and the background monitoring well. One (1) monitoring well will be installed within the application area of the irrigation heads (see application area outline displayed in the HSWP).

This well location will be selected randomly with a bias toward lower surface elevations within the application area to account for MDEQ concerns of uneven wastewater application. The remaining monitoring well will be installed hydraulically down-gradient from the irrigation area to evaluate the potential for dissolved transport and to enhance the overall understanding of the potentiometric surface in the upper-most usable aquifer.

In accordance with MAC Rule 324.2221, if conditions are observed during field activities that suggest modification to this and the prior HSWP are appropriate, then we will contact you by telephone and seek approval for proposed modifications. These same will be formalized in writing in accordance with the rule.

Please call me if you have any questions at (231) 933-4041. I look forward to hearing from you.

Respectfully submitted,
INLAND SEAS ENGINEERING, INC.

Andrew Smits, P.E.
Environmental Engineering
Department Manager

cc:
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